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Synchrotron Fourier Transform Infrared Mapping: A Novel Approach for Membrane Fouling Characterization

We described a synchrotron Fourier transform infrared (IR) microscope method to characterize fouling layer. Combined fouling with organic foulant and colloidal silica in membrane distillation (MD) was used as an example. The synchrotron IR mapping was capable of revealing the spatial distribution of foulants as well as chemical information of foulant-membrane interface. Our results showed that synchrotron IR mapping was able to resolve the foulant spatial distribution in combined fouling in MD. Synchrotron IR mapping showed the spatial distribution of binary foulant (i.e., colloidal silica with alginate, bovine serum albumin (BSA) and humic acid, respectively) of the cross-section of MD fouling layer. The well-resolved synchrotron IR mapping is also able to quantify the foulant distribution along the cross-section of the fouled MD membrane, providing detailed description regarding the transport and accumulation of specific foulant, which is of paramount importance to elucidate fouling mechanisms. Our results indicate that the synchrotron IR mapping method has considerable potential for both qualitative and quantitative characterization of membrane fouling layer.

Keywords or phrases (comma separated)

Membrane fouling, Synchrotron Fourier Transform Infrared Mapping; Membrane Distillation

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No

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No

Are you an ECR? (<5 yrs since PhD/Masters)

Yes

What is your gender?

Male

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